# Chapter 22: Prokaryotes: Bacteria and Archaea

#### Learning Objectives:

* Biology I: I2 – Identify the evolutionary processes that lead to adaptation and biological diversity; I3 – Describe how the unity and diversity of life on earth emerge as a result of genetic inheritance through DNA and evolution by natural selection; II8 – Recognize cells as the basic unit of life in all living organisms; compare and contrast the differences between prokaryotic and eukaryotic cells; III3 – Describe the structure, function, and reproduction of cells, including viruses and microorganisms; V3 – Explain how cell regulatory mechanisms ensure balance in living systems that interact continuously with their environments; V5 – Describe the process of energy transfer from its source (the sun) through biological systems.
* Biology II: I3 – Describe the evidence that endosymbiotic events resulted in the evolution of eukaryotic cells from prokaryotic ancestors; II3 – Recognize cells as the basic unit of life in all living organisms; compare and contrast the differences between prokaryotic and eukaryotic cells; V1 – Explain how regulatory mechanisms at the level of the whole organism ensure balance in living systems that interact continuously with their environments; compare regulatory mechanisms within and across species; V2 – Describe the relationship between life forms and their environment and ecosystems; V3 – Describe the different types of relationships that exist between living organisms.

1. Group Project: Read the “Everyday Connection” on p. 618. Prepare a five minute in-class presentation on one of these topics.  
  
1. Fecal transplants starting from: https://www.hopkinsmedicine.org/gastroenterology\_hepatology/clinical\_services/advanced\_endoscopy/fecal\_transplantation.html  
2. Normal gut microbiota and mental diseases using these recommended sources: https://www.scientificamerican.com/article/mental-health-may-depend-on-creatures-in-the-gut/ https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5641835/  
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5987167/   
3. The hygiene hypothesis starting from this source:  
https://www.fda.gov/vaccines-blood-biologics/consumers-biologics/asthma-hygiene-hypothesis  
4. The Wakefield vaccine fraud is likely to go down as one of the most serious frauds in medical history. Start with the reference below and show that the anti-vaccine movement is based on falsified information and medical fraud.  
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3136032/  
http://www.cnn.com/2011/HEALTH/01/05/autism.vaccines/index.html

2. In-Class Project:  
  
A) Find the correct answers to Review Questions #4 to 16 on page 625. Note the page of Chapter 22 on which you found the answer. Be prepared to share your group’s answers with the rest of the learning community.

B) Find the correct answers to Review Questions #17 to 29 on pages 625 and 626. Note the page of Chapter 22 on which you found the answer. Be prepared to share your group’s answers with the rest of the learning community.

3. Outside of Class Homework:  
Answer the following Critical Thinking Questions on page 626: 31, 35, 38, 39, 41